EXHIBIT C

ANALYSIS & INFERENCE

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Expert Report

Kitchen Winners NY Inc. v. Rock Fintek LLC
S.D.N.Y. Civil Action No. 1:22-cv-5276

Prepared for Lipsius-BenHaim Law, LLP

by

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Contents

1 Introduction

¶1 Lipsius-BenHaim Law, counsel for counterclaim defendant Kitchen Winners LLC and third-party defendants Joseph Mendlowitz and Adorama, Inc., engaged me to provide statistical assistance to respond to a statistician's expert report, Carson (N.D.), and a laboratory expert report, Poulton (2024), concerning sampling and analyzing medical examination gloves, respectively. Counsel also provided a separate laboratory report of four nitrile gloves for review, Pynnonen (2023).

¶2 These reports opine on the chemical and physical properties of small samples of nitrile gloves (Poulton; Pynnonen) and the information such results might provide about the characteristics of a population of approximately 190,000 cases of gloves (Carson).

¶3 I have relied on the documents listed below in Section 5, Materials Used.

¶4 The principal players in this dispute are:

a. The importer, Kitchen Winners.

b. The immediate purchaser, Rock Fintek.

c. The ultimate customer, Ascension Health Resource & Supply Management Group, LLC ("Ascension").

d. MedLine Industries ("MedLine"), a "third-party logistic program," Jaeger (2023) 8:8 – 8:23, that stored boxes of gloves on pallets in 11 of its warehouses around the United States.

¶5 My qualifications to perform this review derive from 37 years of training and practice in applied statistics as a consultant; advanced education and research in mathematics (Ph.D., Columbia University) and spectroscopy research (at Oak Ridge National Laboratories); and recognition by peers with the PSTAT® certification awarded by the American Statistical Association. Much of my statistical consulting has focused on interpreting laboratory analytical data (primarily from analyses of environmental samples of soil, air, and water, but also with substantial experience with analyses of various consumer products). I have been accepted by courts as a statistical expert for testimony related to statistical sampling and chemical analyses of environmental samples.

¶6 A copy of my CV is attached. My company, Analysis & Inference, charges $500 per hour for my work, including all testimony.

¶7 This report represents my professional opinions, all of which are stated with a reasonable degree of professional certainty.

2 Summary of Opinions

¶8 The statistical expert report, Carson (N.D.), assumes gloves from ninety pallets have been sampled randomly from (or at least are "representative" of) the population of all gloves stored in the MedLine warehouses. However, information available about the pallets selected for that sampling indicates the sampling was not random. To justify any of the methods described by Carson for extrapolating the sample results to the entire population would require assuming that the process of selecting those gloves from ninety pallets did not bias the results any material way (towards obtaining either gloves likely to conform to quality specifications or gloves unlikely to conform). I have not located any evidence or documentation to support such assumptions.

¶9 The ARDL lab reports of glove testing (as compiled in Poulton (2024)) are inconsistent, riddled with typographical errors, incomplete, and do not clearly identify most (if any) of the samples that were tested. Their results are difficult (if not impossible) to relate to each other, nor can they be related to warehouses, pallets, boxes, or any kind of "lots" of gloves. I have no information that would permit drawing any kind of inferences about the remaining population of all unsampled gloves from these results. The materials I have do not permit me to determine whether or to what extent any of the ARDL results concern any of the gloves from the ninety pallets discussed by Dr. Carson.

¶10 The SGS-IPS report, Pynnonen (2023), which detects NBR (nitrile butadiene rubber) in four gloves, appears to contradict the ARDL reports, which find that most of the gloves it analyzed are made of PVC (polyvinyl chloride). However, I have no information concerning how those four gloves were selected and therefore cannot draw any conclusions about the composition of any other gloves.

3 Analysis

3.1 Data sources and procedures

¶11 I found the following documents to be original sources of data (such as laboratory reports) or compendiums of data (such as computer worksheets).

a. Poulton (2024) appears to be an expert report commissioned by Pollack Solomon Duffy LLP on behalf of Rock Fintek. Dr. Poulton is employed by ARDL, a testing laboratory. Along with providing opinions, this report also conveys the results of chemical and physical testing of gloves. It incorporates portions of other ARDL testing reports and includes some complete ARDL reports as attachments.

b. Jones-Hamrick (2021). This is an ARDL report of "physical testing" of "eight lots of MedCare Nitrile Examination gloves."

c. Ruff (2021). This is an ARDL report of "analytical testing" of "three lots of gloves."

d. Pynnonen (2023), a laboratory report of analyses of four glove samples requested by Lipsius-BenHaim Law.

e. Swearingin (2021), Excel file "MEDLINE_00030.xlsx." (I will refer to this as "MedLine 00030.") This is a single worksheet with twenty-four records that appear to describe either individual gloves or boxes of gloves. Jaeger (2023) at 30:7 – 31:14 explains these are observations made of "a single pallet or a couple pallets" at the Grayslake, IL distribution center by a MedLine employee. It includes a photograph of three gloves and four photographs of boxes of gloves.

f. Bhandari (2022a), Excel file "MEDLINE_00031.xlsx." This file consists of two worksheets, [PUTAWAY] and [CURRENT STOCK]. Jaeger 34:2 – 37:17 discusses their contents.

g. Bhandari (2022b), Excel file "Copy of MEDLINE_00031 (FOR EXPERT REVIEW).xlsx." This augments the [CURRENT STOCK] sheet in Bhandari (2022a) with two columns headed "X" and "BRANCH LOCATION". I rely on the latter and refer to it as "MedLine 00031."

h. "Medcare Exam Gloves at Medline Branches," an undated, unattributed table of "branch" (warehouse) codes, addresses, and quantities of gloves.

i. Rachunov (2023) is an Excel file headed "DECEMBER 11, 2023 SUMMARY OF MEDCARE BRAND GLOVE LOT NUMBERS SOLD TO ROCK FINTEK AND TESTNG TO DATE." It contains thirteen records identified by "Lot Number" with references to "sources of information."

¶12 Following my standard practice for reviewing and analyzing data, I created graphical summaries to understand the nature and contents of the data and to check for internal consistency or evidence of erroneous data. I focused on information that might be related to glove quality and sampling the gloves, including where the gloves are located, when they were put there, and how many were stored in each pallet of boxes. These figures are collected at the end of this report in Section 6.

3.2 The Carson Report

¶13 "Sampling consists of selecting some part of a population to observe so that one may estimate something about the whole population," Thompson (1992) p. 1. I will therefore use "sample" to refer to the selected part of a population and call each of its members the "sampling units" of the sample. (This differs from the laboratory meaning of "sample" as a single physical object to be measured.)

¶14 Dr. Carson's opinions are about a "sampling design of gloves by Rock-Fintech [*sic*]." In Thompson's words (*id.* p. 2), "the procedure by which the sample of units is selected from the population is called the sampling design." The reference to Rock-Fintek suggests this is not a sampling design created or recommended by Dr. Carson but was created and executed by Rock-Fintek. I have copies of all case-related documents on which Dr. Carson relies (as listed in his Attachment C), apart from "correspondence from Jason Poulton, PhD," but none of them describe a Rock-Fintek sampling design. I therefore have not been able to evaluate that sampling design, whatever it might be, except indirectly through Dr. Carson's description of it.

¶15 An adequate description of a sampling design will include the following information, Cochran (1977) pp 5 – 7:

a. A statement of its objectives, including any formal tests or decisions that are planned and criteria for the decision risks (such as test size, power, and effect size).

b. Clear characterization of the population (or process) to be sampled.

c. A description of the "unit of observation," which in this instance could be a part of a glove, a whole glove, a box of (100) gloves, a case of (10 boxes of) gloves, a pallet of (between 1 and 98 cases of) gloves, or a warehouse in which the pallet is located.

d. Explanation of how the observational units will be evaluated or measured.

e. Specification of how the sample will be selected (ideally stated with sufficient clarity that the selection can be reproduced by an independent third party).

f. Discussion of the reasoning and bases for the sample design.

¶16 The Carson report describes (a), (b), and (f). It provides only a partial account of (c), (d), and (e).

¶17 The principal objective is to use the results of testing a sample of gloves to draw formal statistical conclusions about how many gloves among all those stored at 11 warehouses have specified physical and chemical properties. Such conclusions are known in statistics as *estimates* and in some other fields as *extrapolations.* A statistical estimate can be performed when (roughly speaking), for any one of the (usually very large) number of samples that *could* be collected following the guidance of the sample design, it is possible to compute (either exactly or at least approximately) its chance of being *the* sample that is obtained, Thompson, *id.* at p. 7.

¶18 Although some of the information listed above in ¶15 can be inferred from the Carson report, much is left to be guessed at – and I cannot fill in the gaps from any of the other materials I am aware of. The following is a list of missing or unclear information:

a. What does "good precision" mean?

b. Three warehouses were sampled. Why were only three of the eleven warehouses chosen?

c. Why were thirty pallets selected in each warehouse? That is, why the specific count of thirty and why was the same quantity selected in each warehouse?

d. How were these pallets "randomly" selected?

e. Why is a pallet the unit of selection?

f. What exactly are "accessible" boxes?

g. What does the "failure rate" of gloves mean? Would a "failed" glove be one that does not meet one of the physical requirements, one that does not meet some (unstated) chemical standard, or one that fails to meet one or more of some set of (not fully stated) criteria?

h. What are "production lots" and why can pallets be viewed as "sub-lots" thereof? Dr. Carson's use of the term "lot" does not necessarily coincide with its meaning as printed on the sides of each box of one hundred gloves.

i. What does "excellent basis for estimating the properties of the entire inventory of gloves" mean?

¶19 In the next paragraphs I will discuss some of these issues and their implications, using the data summarized in the figures to illustrate and support the discussion.

3.2.1 Only three warehouses were sampled: they are not "representative."

¶20 Figure 1 gives an overview of the "current stock" of boxes of gloves in the eleven warehouses, or "branches," used by MedLine to store the gloves. It confirms that the warehouses located in IN, MI, and IL contain the most gloves. However, collectively they account only for 61% of all the gloves: see Table 1.

Table 1 Boxes of Gloves Stored in the Largest Warehouses

Warehouses	Boxes	Proportion
3 largest	116,548	0.61
8 others	74,366	0.39
All	190,914	1.00

¶21 Dr. Carson explains, "For sampling purposes, these were the most representative warehouses." It is unclear what "representative" specifically means or even what it means to be "more" or "less" representative, much less "most" representative. What is left for the reader to infer is that *no glove in any of the remaining eight warehouses had any chance of being included in the sample*. Consequently, any sense in which the gloves from the three largest warehouses[1] might be considered "representative" must rely on assumptions concerning similarities in the provenance and conditions of gloves in the other eight warehouses.

¶22 The data in MedLine 00031 permit the warehouses to be compared based on (i) when MedLine placed gloves in each location; and (ii) how many boxes are packed in each location (or pallet). Figure 3 and Figure 4 plot when each case arrived and how many boxes it contains separately by warehouse. Figure 5 is a timeline of cumulative total cases by warehouse, giving a clearer picture of the rates at which cases arrived and when they were arriving most frequently.

¶23 These plots show that Medline placed the gloves at different warehouses at different times. The largest warehouse, C89, filled up quickly in early 2021. Towards the end of that period MedLine began to fill the third largest warehouse, C02. Later in the spring of 2021, MedLine primarily stored gloves at other warehouses. Most gloves had been stored by mid-2021. Most of those stored after then were placed in the second-largest warehouse, B48. Thus, *many warehouses tend to contain sets of gloves stored nearly at the same time, while the storage dates of gloves in different warehouses tend to be different*. Thus, it is unjustifiable to assume the unsampled warehouses contain gloves substantially like those in the sampled warehouses.

[1] I use the numbers of boxes of gloves to characterize the sizes of the warehouses. I have no information about the physical sizes or storage space available.

¶24 Figure 6, Figure 7, Figure 8, and Figure 9 document the pallet sizes in terms of the number of cases of gloves on each pallet (as shown in the "SUOM_QTY" column of MedLine 00031). The numbers of cases per pallet (I will refer to these as the "pallet sizes") range from 1 through 98 (which is the most common). The distributions of pallet sizes within each warehouse are different. For instance, at branches C02 and C89, most pallets contain either 56 or 84 cases, whereas in many other branches, most pallets contain 98 cases. These differences suggest differences in manufacture of the gloves or how they were packaged, shipped, repackaged, and stored. Consequently, *in the absence of any information to the contrary, the default assumption should be that the gloves in some warehouses might differ systematically from gloves in other warehouses*.

3.2.2 The pallet selection does not appear to be random.

¶25 Dr. Carson reports that "From each warehouse, 30 pallets were randomly selected by the MedLine warehouse personnel using the pallet location identifier as a key." The source of that information is not given. *Random* sampling does not mean arbitrary selection. As I noted above, a basic requirement of any random sampling procedure is that the selection probabilities can be computed. Dr. Carson's implication, reinforced by his later references to "Simple Random Sampling Without Replacement" ("SRSwoR") is that within each warehouse, *each possible subset of 30 pallets had the same chance of being the selected sample*. When that is the case, properties of the sample will deviate from properties of the pallets *not* in the sample by predictable amounts in ways predicted by probability theory.

¶26 MedLine 00031 documents the numbers of cases in each pallet and the sizes of the gloves in those pallets. It also documents (in the column headed "X") which pallets were included in the sample. Consequently, I have been able to compare the sampled pallets to the non-sampled pallets based on properties such as glove size, boxes per pallet (pallet sizes), and date. Figure 11, Figure 12, and Figure 13 make these comparisons for pallet sizes. Figure 14, Figure 15, and Figure 16 make these comparisons for dates.

¶27 These figures document a tendency for *smaller pallets* and *later dates* to be included in the sample, especially at C02 (the Illinois warehouse). Statistical testing indicates these visible differences are unlikely to arise when random sampling is used.[2]

[2] I prefer to use a powerful omnibus distribution test like the Kolmogorov-Smirnov test. This test is applicable to the dates, which tend to have relatively few ties, and yields p-values of 37% for C89, 76% for B48, and 0.1% for C02 (all computed using simulation because there are some ties in the data). The first two (large) p-values indicate the *apparent* differences in distributions visible in the plots can be explained through random variation; but the last (small) p-value supports the visual impression that sampling in C02 favored later dates: *at C02, there are relatively too many gloves with dates after late 2021.* For the pallet sizes there are many tied values, so I instead conducted a chi-squared test based on tertiles (of the entire population of gloves in the three sampled warehouses). Although using tertiles loses power, I employ it to avoid unconscious selection of cutpoints in a way that might create the appearance of a significant difference. The pallet size p-values are 1% for B48, 2% for C02, and 77% for C02, suggesting non-random sampling at B48 and C02. *The figures indicate smaller pallets were favored in B48 and C02*.

3.2.3 The selection unit is undefined.

¶28 Assuming for the sake of discussion that selection was truly random, the language in the Carson report suggests pallets were selected with *equal probabilities.* But that means gloves located in pallets with small numbers of cases had larger chances of being included in the sample. For instance, any glove in a pallet with one case of gloves would have 98 times greater probability of being selected than any glove in a pallet with 98 cases of gloves. Because Figure 6 shows a tendency for the smallest pallets to have the latest dates (about half of all pallets with 10 or fewer cases have dates after mid-2022), such a procedure will differentially over-sample the last gloves to arrive. Those gloves could differ in characteristics from other gloves.

¶29 The data contradict Dr. Carson's conclusion "It appears that the pallets were sampled from each warehouse using SRSwoR with the location ID [that is, pallet] as an index."

3.2.4 "Production lots" do not appear to be aligned with pallets.

¶30 Dr. Carson writes that "the pallets can be viewed as sub-lots within the production lots." If that were the case, then all the boxes documented in Swearingin (2021), which Jaeger (2023) has testified came from "either a single pallet or a couple pallets", 31: 12 – 13, would be marked with the same lot or with just a "couple" distinct lot identifiers. They actually comprise two sizes and eight lot numbers. Thus, the homogeneity that Dr. Carson anticipates among gloves on a pallet might not exist.[3] Unless the boxes on a pallet are obtained with a more formal, rigorous selection procedure than described by Dr. Carson (who characterizes the selected boxes as the "accessible" ones), the ability of the sampled boxes to "represent" the entire population grows more doubtful.

3.2.5 Summary of issues exposed in the Carson report.

¶31 The foregoing issues provide evidence that the sampled gloves are *not* "representative" of all the gloves stored at all eleven warehouses. The characteristics of the sampled gloves might differ from those of the unsampled gloves in many unknown ways, making it impossible to support any quantitative statistical inferences that extrapolate the observations of the sampled gloves to draw conclusions about the entire population. This impossibility means that the calculations presented in the remainder of the Carson report are not applicable.

3.3 The Poulton (ARDL) Report

¶32 This report combines the presentation of new testing results (ARDL project 172615) with a discussion of other testing results. The original (and some revised) reports for some of those other testing results are attached to the Poulton report. They are identified as 162931-B Rev. 1,

[3] This conclusion relies on the supposition that different lot identifiers printed on the sides of the boxes indicate different production runs. I have no information concerning the meaning of those printed identifiers.

162931, 162931-A Rev. 1, 164005, 162399, and 161525, corresponding to the materials I reference below in section 5.2, “Additional test reports.”

¶33 Poulton describes testing fourteen “samples” of gloves for total nitrogen and finding none, thereby concluding those gloves were not made of nitrile. Further testing establishes that they were made of polyvinyl chloride.

¶34 Poulton then relates results of testing some physical “properties of the fourteen boxes [of gloves].” These samples are referred to by indices 1, 2, 3, …, 25 (skipping eleven values) as well as by “Lot Number”, such as “T202104” for sample 1. Photographs in some of the attachments indicate these “lot numbers” are printed on the sides of the boxes.[4] Because I can match most of these lot numbers to those listed in the 25 lines of Medline 00030, corresponding to a (very limited) sample of 25 boxes of gloves, I suspect these indices might relate to those lines. If so, this raises the question of why analyses of the other eleven boxes were not performed.

¶35 The physical testing values are always the results of thirteen destructive tests (of tensile strength and elongation). These are then summarized separately: the tensile strength test is deemed a “Fail” when two or more of the tensile strengths are less than 14 MPa while the elongation test is deemed a “Fail” when two or more of the results are less than 500%. Of these fourteen pairs of results, one is “Fail/Fail” and the other 13 are “Pass/fail”.

¶36 The rest of the Poulton report is notable for its redundancies, its typographical errors, its inconsistencies, its lack of clarity, evidence of unexplained omissions and revisions, and lack of any clear connection to either the Carson report or the data in MedLine 00031 (documenting the ninety sampled pallets). I developed these conclusions by creating a compendium of all the results I could find in that report (attached herein as Section 7) and studying it. A “Comments” column in that compendium documents some of the typographical errors, inconsistencies, and vague or confusing identifications of the samples.

¶37 I will provide examples of the problems with the Poulton report. Further problems are noted in the “Comments” column in Section 7 below.

3.3.1 Example: Lot “HFK-2021050102”

¶38 Four ARDL reports mention samples associated with lot “HFK-2021050102.” Within those reports the samples are referred to as sample “3”, “sample “4”, and with no sample identifier at all. In two reports a size “S” is given but no size is mentioned in the other two reports. In one report a “manufacture date” of “2021-5” is stated, but no such information appears in the other reports. Table 2 excerpts this information.

[4] The quality of these photographs is frequently too low to confirm the lot numbers were correctly transcribed.

Table 2 Information for gloves in lot "HFK-2021050102" in the Poulton report

Project	Sample	Size	Man. Date	Test	Outcome	Date	Comment
172615	3			N	ND	1/24/2024	
172615	3			PI	PVC	1/24/2024	
172615	3			P	Pass/Fail	1/24/2024	
162931-B Rev. 1	4	S		PI	PVC	1/20/2022	
162931-B Rev. 1	4	S		N	ND	1/20/2022	Labeled "5" in photo on p. 46
162931				P	Fail/Fail		Maybe sample 4?
161525		S	2021-05	P	Fail/Fail	10/19/2021	"KFK-2021050102" in report

¶39 Because two physical test records are "Fail/Fail" but one record is "Pass/Fail," I suspect this lot number might identify more than one box of gloves submitted for testing. The span of more than two years among the report dates furthers this suspicion.

¶40 Because one report appears to refer to lot "KFK-2021050102," it is unclear whether that is a typographical error ("K" is substituted for its neighboring "H" on the keyboard) or represents a different sample altogether.

¶41 I find no documentation of the reasons for revisions of report 162931. Evidently there were at least two revisions: "Rev A" and "Rev B." Revision B states, without comment or explanation, "Customer requested sample 2 be deleted from report." I find this extremely suspicious because it indicates the customer ("Brad Gilling, Rock Fintek Trading Company") is effectively censoring the laboratory reports. This is problematic because laboratory tests do not necessarily yield the same results when repeated. Thus, it is possible for a customer to achieve "certified" results by rejecting results they do not like and resubmitting them to the laboratory for another analysis. Unless such changes are clearly and fully documented, they can be impossible to detect. I have no way of knowing to what extent this practice was followed in this case, nor why it occurred.

3.3.2 Example: Lot "HFK-202103010101"

¶42 This lot is referenced in five ARDL reports. Associated with it are samples identified as "25", "1", "HFK", and some with no identifier. The glove size, when given, is usually M but in one report it is S. The photograph in one of the reports giving the size as M shows a box clearly labeled "L". At least two different manufacturing dates ("2021.3" and "2021-04") are mentioned. See Table 3.

Table 3 Information for gloves in lot "HFK-202103010101" in the Poulton report

Project	Sample	Size	Man. Date	Test	Outcome	Date	Comment
172615	25			N	ND	1/24/2024	
172615	25			PI	PVC	1/24/2024	
172615	25			P	Pass/Fail	1/24/2024	

Project	Sample	Size	Man. Date	Test	Outcome	Date	Comment
162931-B Rev. 1	1	M		PI	PVC	1/20/2022	Box clearly says size L
162931-B Rev. 1	1	M		N	ND	1/20/2022	Labeled "1" in photo on p. 45
162931				P	Fail/Fail		Maybe sample 1?
162399	HFK	M	2021.3	PI	PVC	12/3/2021	
162399		M	2021.3	N	ND	12/3/2021	
161525		S	2021-04	P	Fail/Fail	10/19/2021	

3.3.3 Example: Lot “MED202011”

¶43 This lot identifier appears in a single ARDL report, 172615, which presents the results of the chemical and physical testing (with a Pass/Fail result) but does not give the glove size or manufacturing date. Over two years earlier, another ARDL report, 161525, reports physical testing of a size M glove from lot “MDE202011” with a Fail/Fail result. This lot identifier looks like a transposed version of “MED202011.” The absence of any other results for “MDE202011” in the Poulton report suggests this is just a typographical error: but then do these results reflect different test results for the same sample (box of gloves) or of different samples?

Table 4 Information for gloves in lots “MED202011” and “MDE202011” in the Poulton report

Project	Sample	Lot	Size	Man. Date	Test	Outcome	Date
172615	11	MED202011			N	ND	1/24/2024
172615	11	MED202011			PI	PVC	1/24/2024
172615	11	MED202011			P	Pass/Fail	1/24/2024
161525		MDE202011	M	2020-12	P	Fail/Fail	10/19/2021

3.3.4 Relationship with MedLine 00030, Swearingin (2021)

¶44 This spreadsheet documents twenty-five boxes of gloves of two sizes (“Small” and “Medium”) associated with eight distinct lot numbers. These boxes were not randomly selected (and all were taken from one pallet or a few pallets in one warehouse, Jaeger (2023)). All those lot numbers appear among the ARDL reports, suggesting that most or all the ARDL testing concerns this *unrepresentative convenience sample*.

Table 5 Relationships between ARDL “Lot Numbers” and Lot Identifiers in MedLine 00030

ARDL “Lot Number”	Appears in MedLine 00030?
20201106	No
HFK-202103010101	**Yes**
HFK-2021050102	**Yes**
MED202011	No

ARDL "Lot Number"	Appears in MedLine 00030?
MED202101	**Yes**
MED202102	**Yes**
MEDCARE202101	No
MEDCARE202103	**Yes**
No lot number	No
QDMD01202002	**Yes**
T202104	No
T4	No
ZKMD012	No
ZKMD01202101	**Yes**
ZKMD01202104	**Yes**

3.3.5 Summary of issues exposed in the Poulton report

¶45 The information in the Poulton report does not clearly correspond to identifiable glove samples. There is evidence that different samples are identified in the same way and evidence that the same sample might be identified in different ways. Regardless of these redundancies and inconsistencies, these reports contain no information about the provenance of the samples: absent are any references to warehouses or pallet identifiers. More often the glove sizes are not mentioned, thereby failing to distinguish among different boxes that might have the same lot numbers printed on them.

¶46 It is impossible to relate the ARDL results to the sampling plan described in the Carson Report, which refers to ninety boxes of gloves. The number of distinct sample descriptors (lot, name, manufacturing date, and size) does not approach 90. The sample descriptors have nothing perceptible in common with the identifiers of the warehouses and pallet locations. I cannot even tell whether the ARDL report represents only gloves that are *not* part of the sampling described by Dr. Carson, or represents some gloves in the sampling, or is intended to represent that entire sampling program.[5]

3.4 The SGS-IPS Report

¶47 This report, Pynnonen (2023), presents the results of "qualitative" infrared spectroscopy tests of "four NBR glove samples." It identifies the samples as "7/17/23 40-26-C1", "Middletown", "6/13/23 WH955ODD0300", and "6/13/23 WH9251CC0200". It concludes that the "outer glove surface" in each of the four samples does contain "NBR/nitrile rubber [as] a component."

¶48 The analytical method described in this report scans tiny sections of the surface of a glove, obtains a spectrum in each section, and reviews it for a signal characteristic of NBR. This method can *detect* the presence of a compound but was not used to *quantify* its concentration

[5] The comparison to MedLine 00030 suggests all the ARDL results characterize only that non-random, non-representative sample of one or "a couple" pallets.

within the gloves. Thus, it is not possible to compare these results to the ARDL results. Qualitatively, though, the SGS-IPS results differ from the ARDL results, which in all but one sample found no nitrogen (a substantial component of NBR) and determined the gloves were made of PVC, a compound with no nitrogen in it.

¶49 Because I have no information about how any of the samples were selected for the ARDL testing or the SGS-IPS testing, I cannot draw any conclusions about the millions of gloves stored in the MedLine warehouses. Absent such information, *nobody* can support any such conclusion about untested gloves.

4 Conclusions

¶50 I find no evidence that any of the materials I have reviewed, including Dr. Carson's report and all the laboratory results in Dr. Poulton's report, support any inferences about the quality or composition of the remaining unsampled gloves.

¶51 There is evidence in Medline 00031 about pallet sizes and dates, as illustrated in my figures, to suggest the ninety pallets described in Dr. Carson's report were not randomly sampled. They do not "represent" the entire population of gloves.

5 Materials Used

5.1 Initial documents

Carson Jr., John H. N.D. "Expert Report of John H. Carson Jr., Ph.D."

"Counterclaim and Third Party Complaint." 2022. SDNY Civil Action No. 22-cv-05276-PAE.

Jaeger, Brad. 2023. Brad Jaeger Condensed Depo Transcript (w Errata - Notarized).

"Notice of Removal." 2022. SDNY Civil Action No. 22-cv-5276.

Poulton, Jason T. 2024. "Kitchen Winners NY Inc. v. Rock Fintek LLC Case Number: 1:22-Cv-05276-PAE." Expert report. ARDL.

Pynnonen, Christine M. 2023. "Four NBR Glove Samples / Report of Analyses." Laboratory testing SGS-IPS 01662-23. SGS-IPS Testing.

"Sales and Purchase Agreement - Kitchen Winners to Rock Fintek." 2021.

5.2 Additional test reports

Jones-Hamrick, Sandy. 2021. "Test Report PN 161525 / PO / Physical Testing Department." ARDL. Prepared for Mike Elstro, Ascension.

---. 2021. "Test Report PN 161525 / PO / Physical Testing Department." Prepared for Mike Elstro, Ascension. (Included as pp 83 – 92 of Poulton, *q.v.*)

Ruff, W. Matthews. 2021. "Test Report PN 162399 / Credit Card / Chemical Analytical Services." ARDL. Prepared for Mike Elstro, Ascension.

---. 2021. "Test Report PN 162399 / Credit Card / Chemical Analytical Services." ARDL. Prepared for Mike Elstro, Ascension. (Included as pp 74 – 82 of Poulton, *q.v.*)

---. 2022. "Test Report PN 164005 / CC Payment / Chemical Analytical Services." ARDL. Prepared for Brad Gilling, Rock Fintek Trading Company. (Included as pp 65 – 73 of Poulton, *q.v.*)

Wilde Sr. Arthur. 2022. "Test Report PN 162931-A Rev. 1 / CC Payment / Chemical Analytical Services." ARDL. Prepared for Brad Gilling, Rock Fintek Trading Company. (Included as pp 36 – 41 of Poulton, *q.v.*)

---. 2022. "Test Report PN 162931-B Rev. 1 / CC Payment / Chemical Analytical Services." ARDL. Prepared for Brad Gilling, Rock Fintek Trading Company. (Included as pp 42 – 64 of Poulton, *q.v.*)

5.3 Data files

Bhandari, Anup. 2022a. "MEDLINE_00031.xlsx."

Bhandari, Anup. 2022b. "Copy of MEDLINE_00031 (FOR EXPERT REVIEW).xlsx."

"Medcare Exam Gloves at Medline Branches (Gloves by Medline Branch (1).Docx)." n.d.

Rachunov, Phillip. 2023. "231211 Summary of Lot Numbers for Expert.xlsx."

Swearingin, Adam. 2021. "MEDLINE_00030.xlsx."

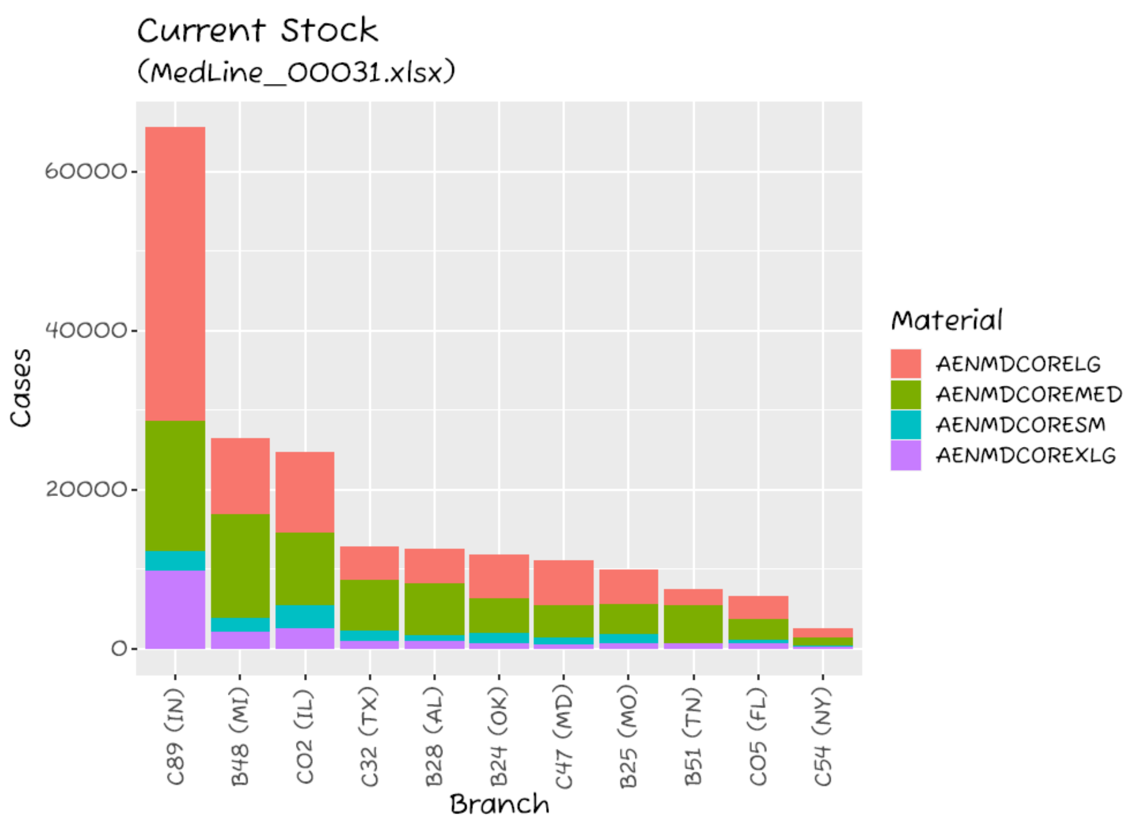
5.4 References

Cochran, William G. 1977. *Sampling Techniques*. First Ed. Wiley Series in Probability and Mathematical Statistics -- Applied. John Wiley & Sons, Inc.

Thompson, Steven K. 1992. Sampling. First Ed. John Wiley & Sons, Inc.

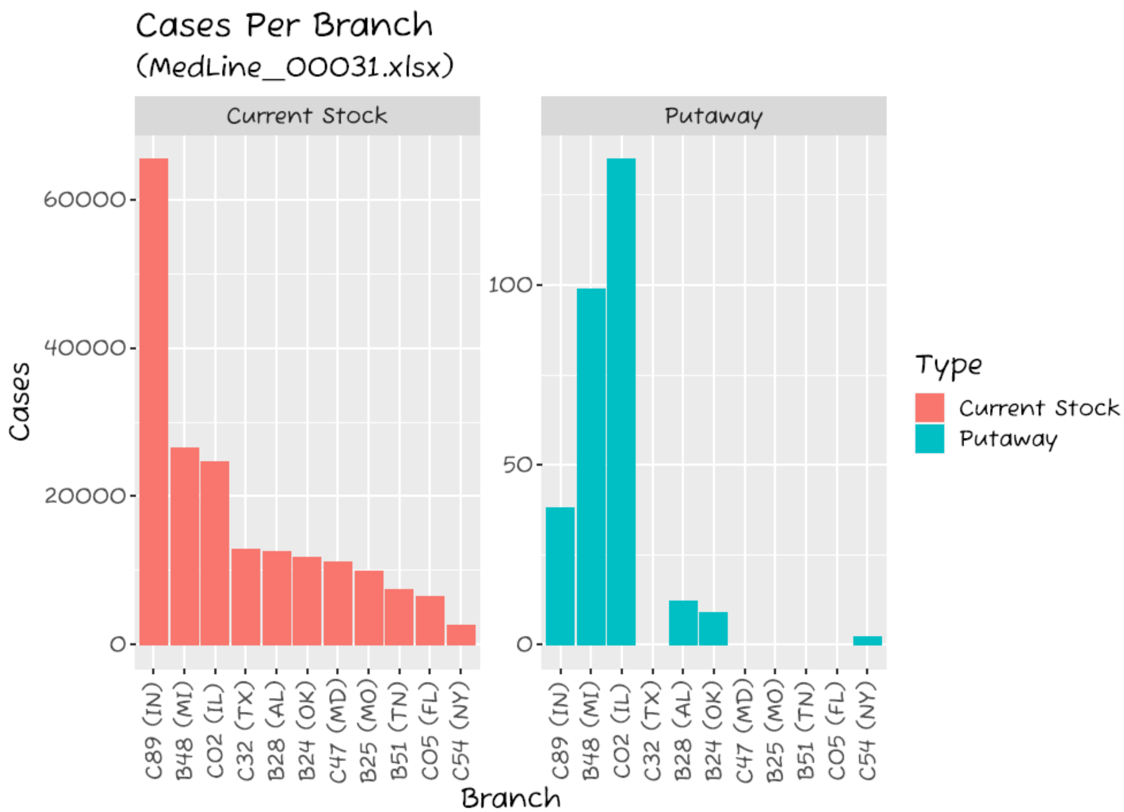
6 Figures

Figure 1 Overview of the "current stock" of gloves by location and size



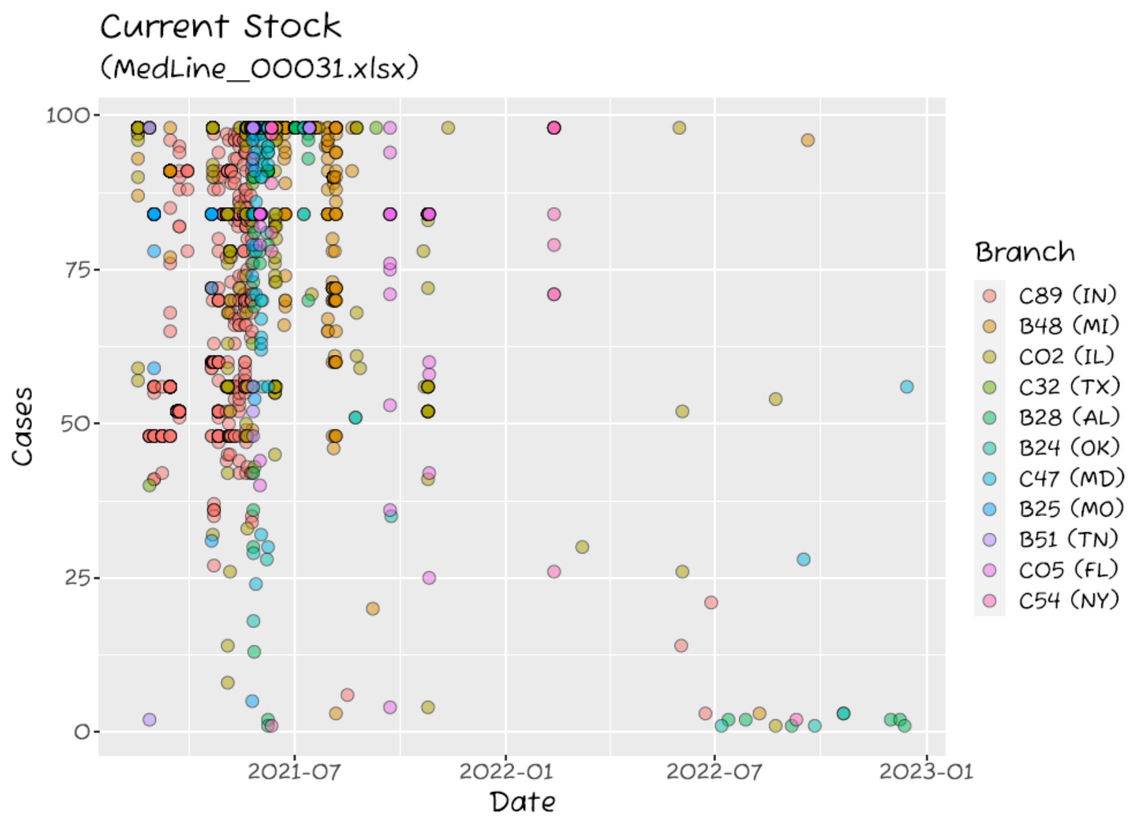
"Material" is the column header in the worksheet. I understand it to indicate glove size; *e.g.*, "AENMDCORELG" are size "L" (large) gloves.

Figure 2 Cases of gloves by branch and status



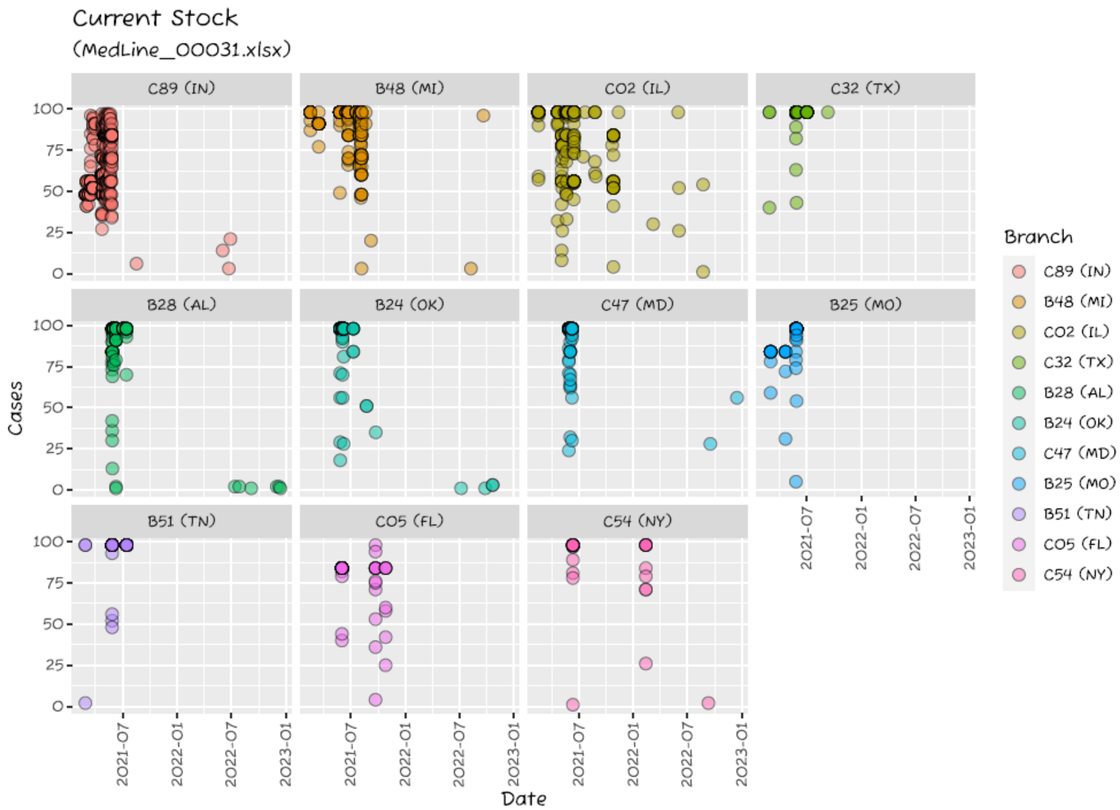
I do not have clear information about what "Putaway" means: Jaeger (2023) at 34:2 - 11 could not explain how it might differ from "Current Stock." These plots make it clear that "putaway" counts are so small compared to the "Current Stock" values that they will play no material role in characterizing the population of all gloves.

Figure 3 Times that "current stock" arrived in the warehouses



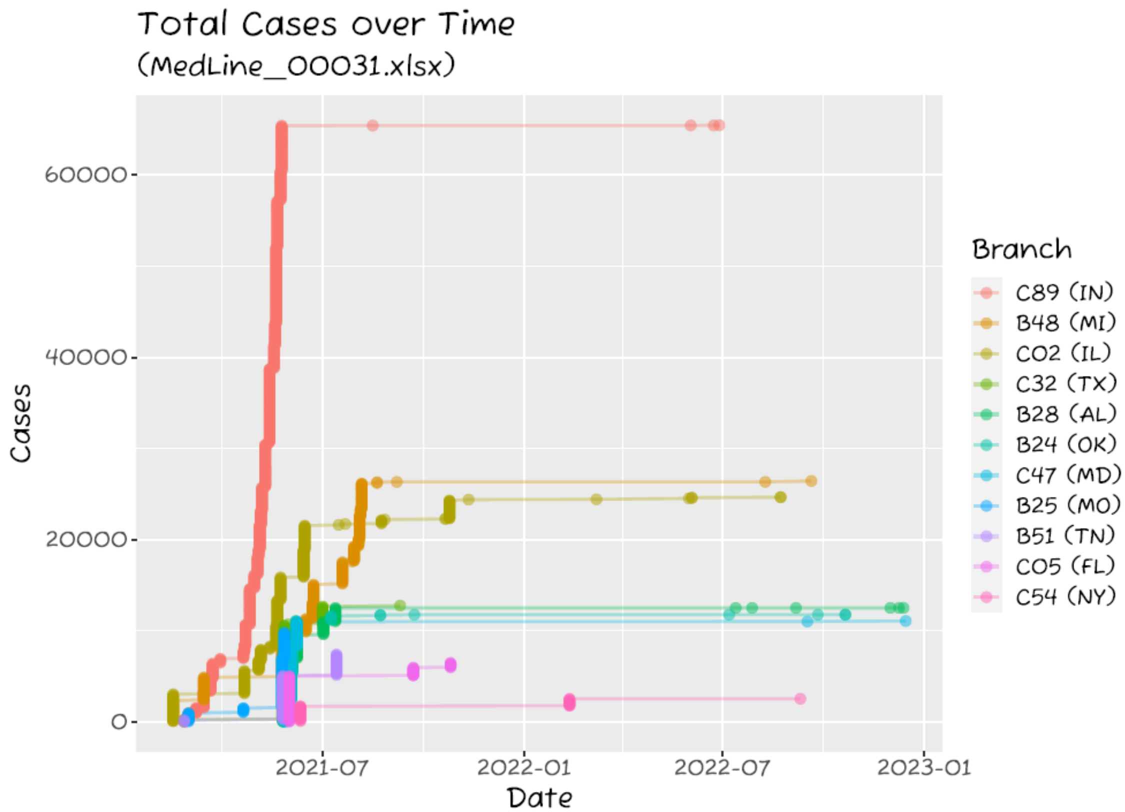
A "branch" is a term for a warehouse. Each dot represents a unique warehouse "location." 2344 dots appear in this figure: many of them overlap, corresponding to multiple arrivals of pallets of gloves on the same day.

Figure 4 Times that "current stock" arrived in the warehouses, shown by warehouse



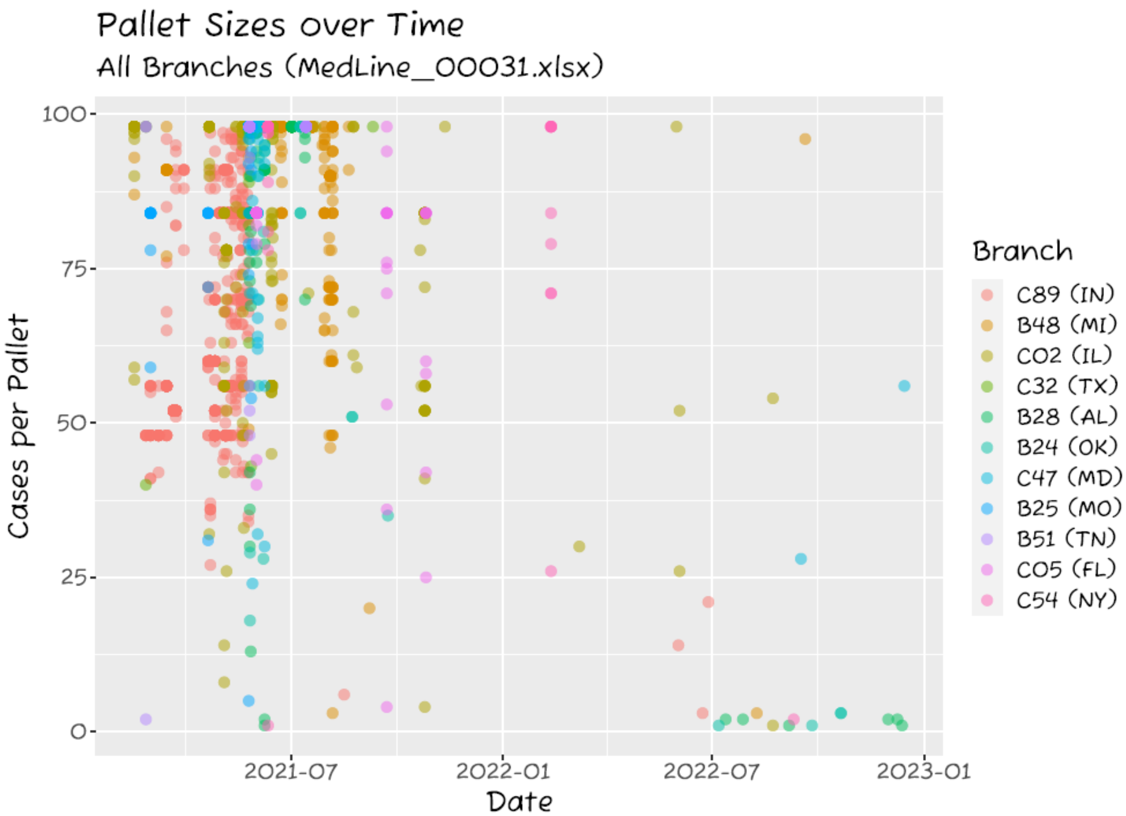
This figure resolves some of the overlapping points by devoting one warehouse to each panel. The warehouses are sorted by decreasing total amounts of gloves, left to right and top to bottom.

Figure 5 Accumulated total cases over time



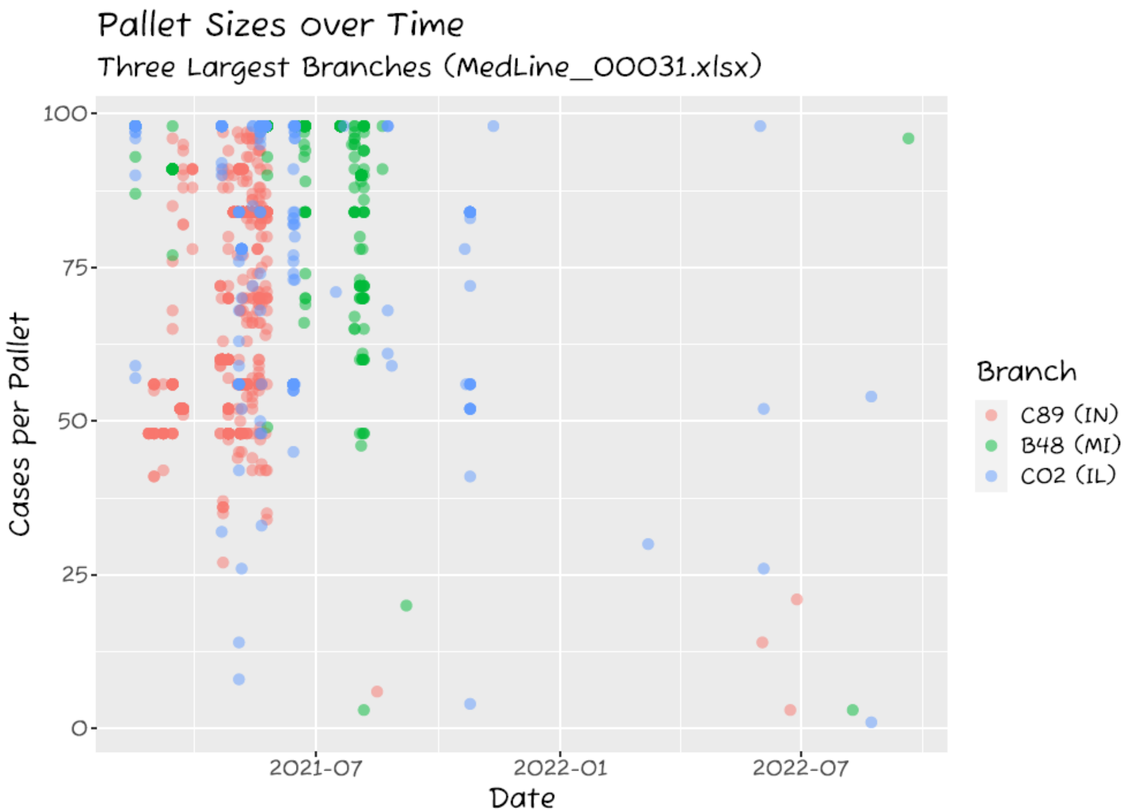
This figure resolves the overlapping dots by plotting the cumulative numbers of boxes over time.

Figure 6 Pallet sizes over time



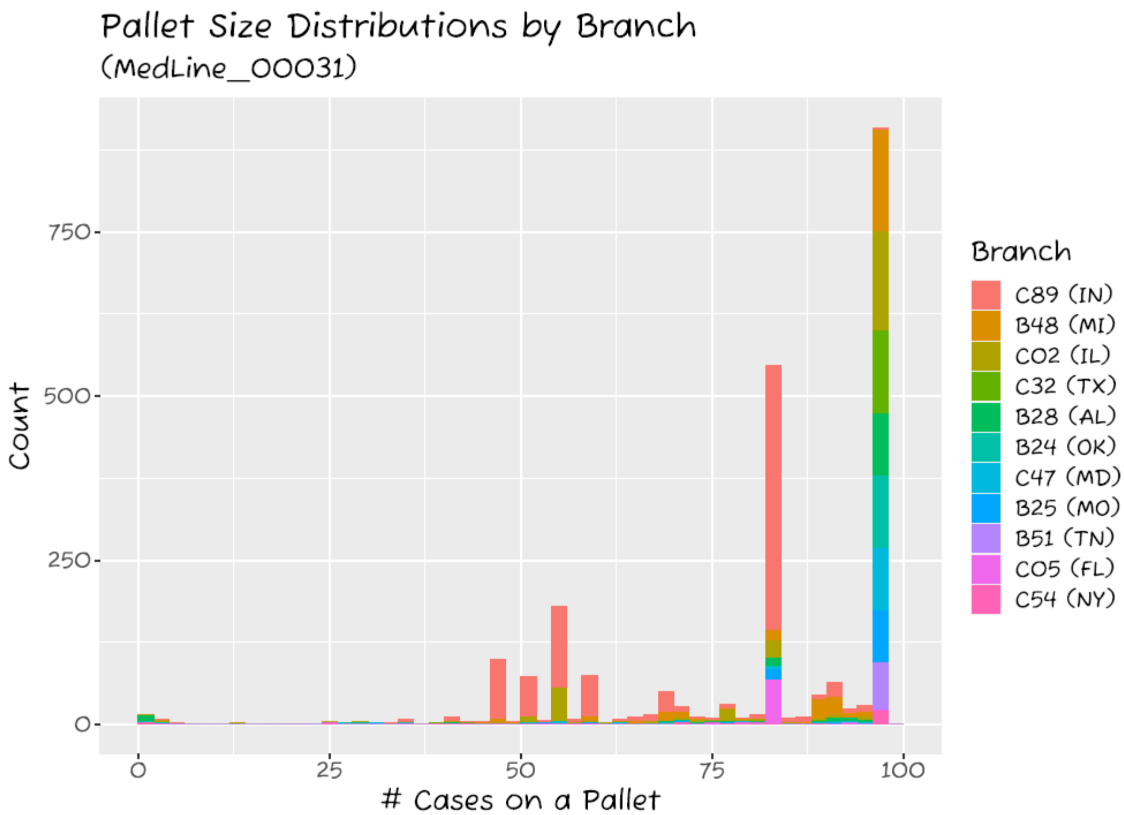
Not all pallets (locations) contain the same numbers of gloves. This graphic reveals the extent and amount of variation in pallet sizes and shows an evolution towards lower sizes over time. Pallets appear to be limited to 98 boxes.

Figure 7 Pallet sizes over time for the three largest warehouses



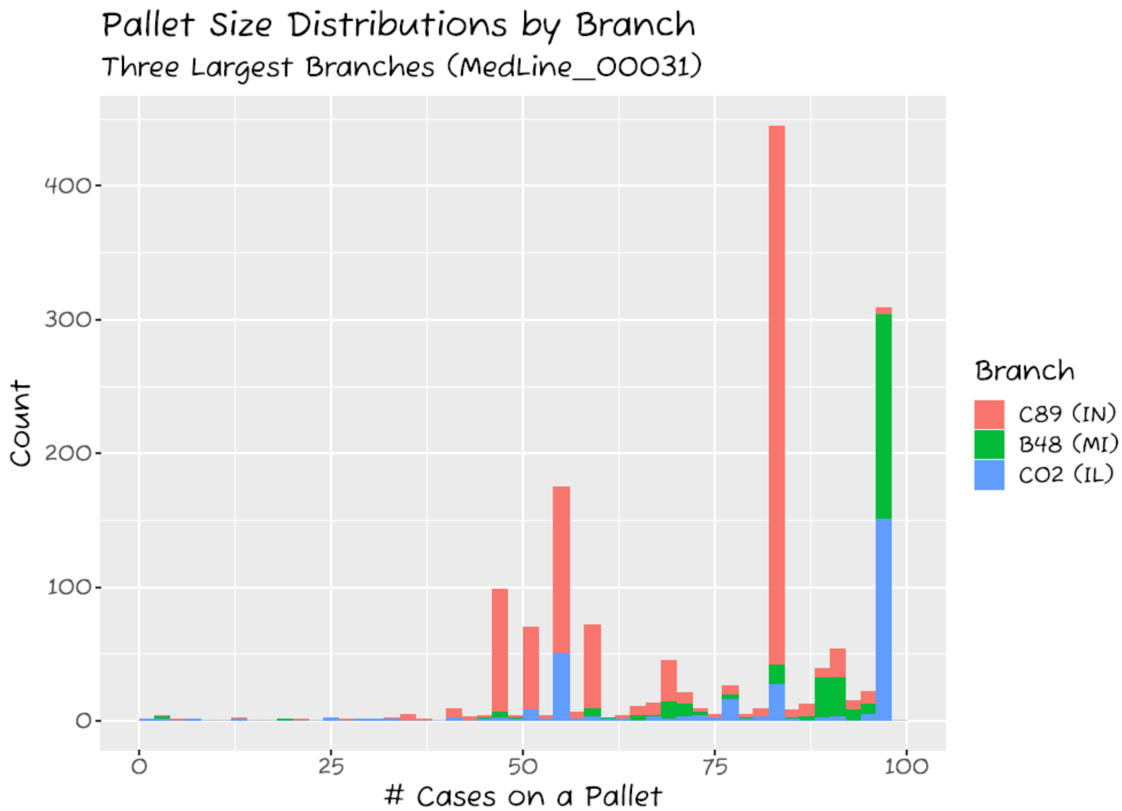
Carson (N.D.) claims "the three [warehouses] with the largest inventories were sampled." This figure focuses on the pallet sizes within those warehouses.

Figure 8 Pallet size distributions by warehouse



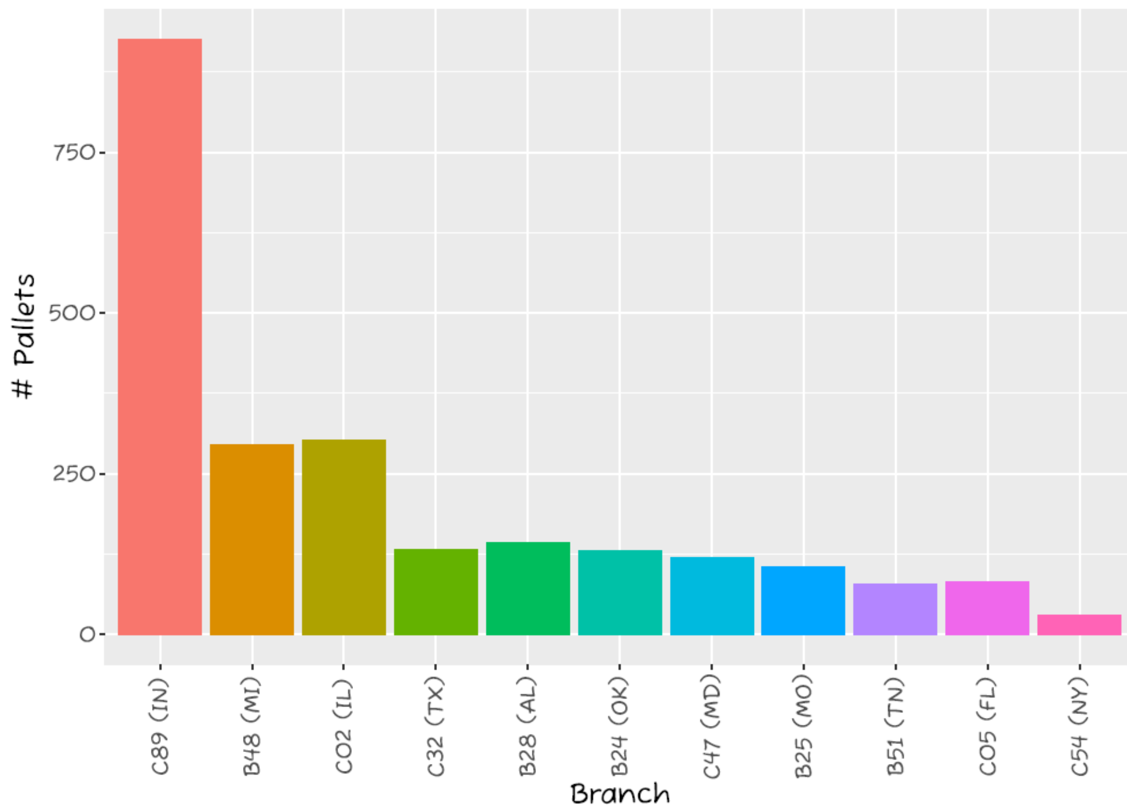
These histograms resolve the overlapping dots by summarizing them. It demonstrates a tendency for pallets to contain 98, approximately 80, and 45 – 60 cases. It shows different distributions at different warehouses.

Figure 9 Pallet size distributions by warehouse, three largest warehouses



By focusing on the three largest warehouses, this plot more clearly shows the differences in pallet size distributions. Most pallets in B48 and C02 contain 98 cases of gloves (almost always 70 or more), while in the largest warehouse C89, few pallets contain more than 80 cases and many pallets contain 45 – 60 cases.

Figure 10 Number of pallets per warehouse



Because the largest warehouse (C89) also has fewer boxes per pallet on average, it has by far the most pallets.

Figure 11 Distributions of Pallet Sizes between Sampled and Unsampled Locations

The “theoretical” values are used as a common reference to evaluate differences in distributions of pallet sizes. They make no suppositions about what the actual distributions might be.

Figure 12 Comparison of Pallet Size Distributions by Branch: Histograms

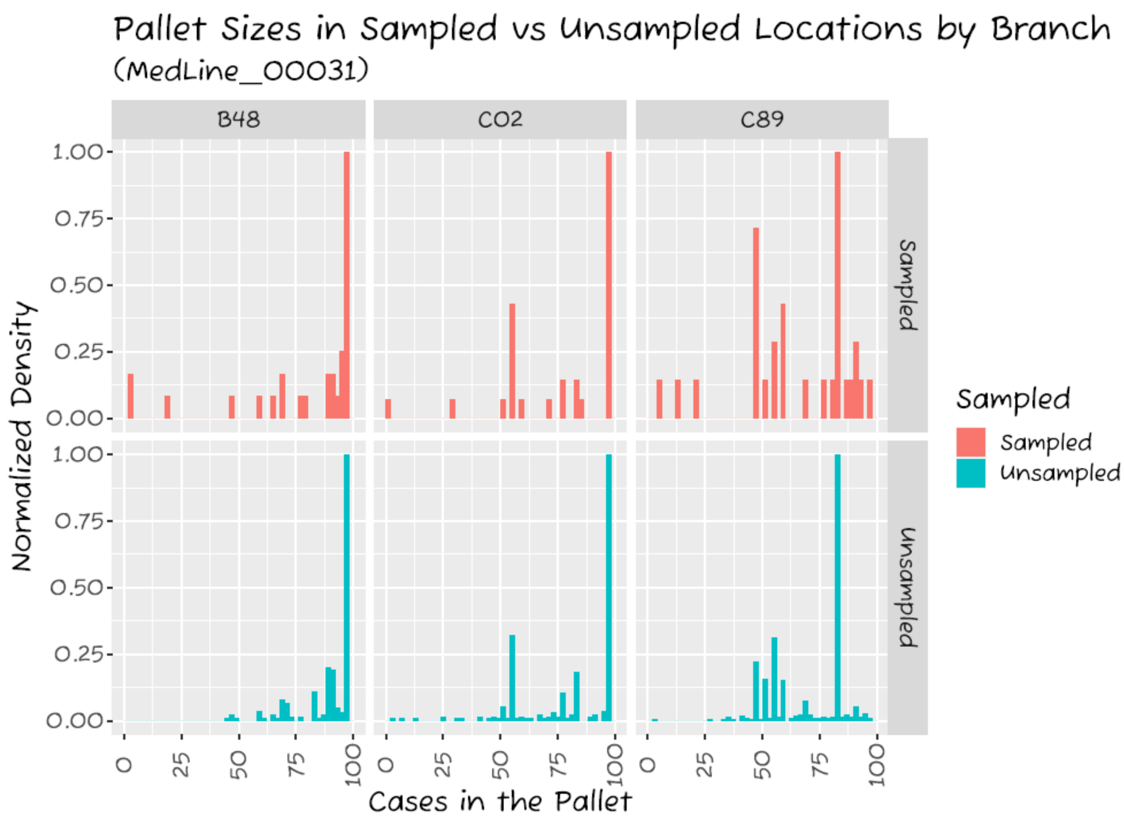


Figure 13 Comparison of Pallet Size Distributions by Branch: Density Plots

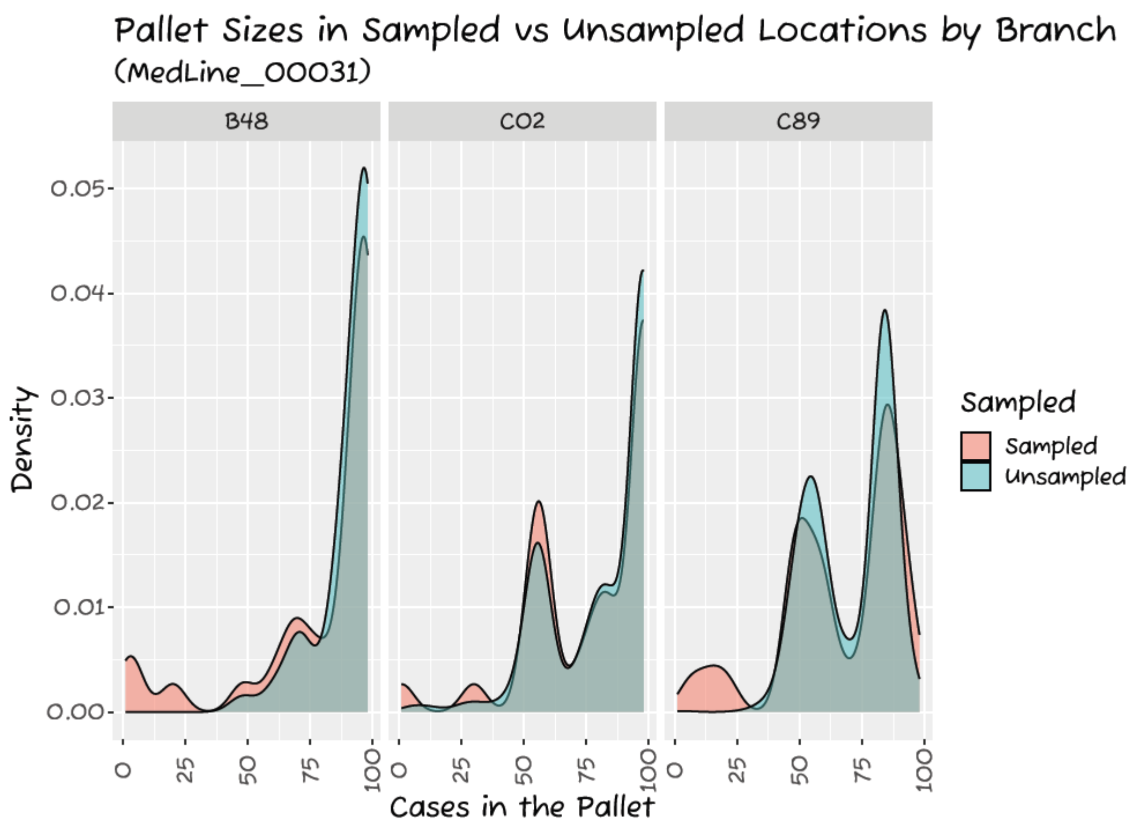
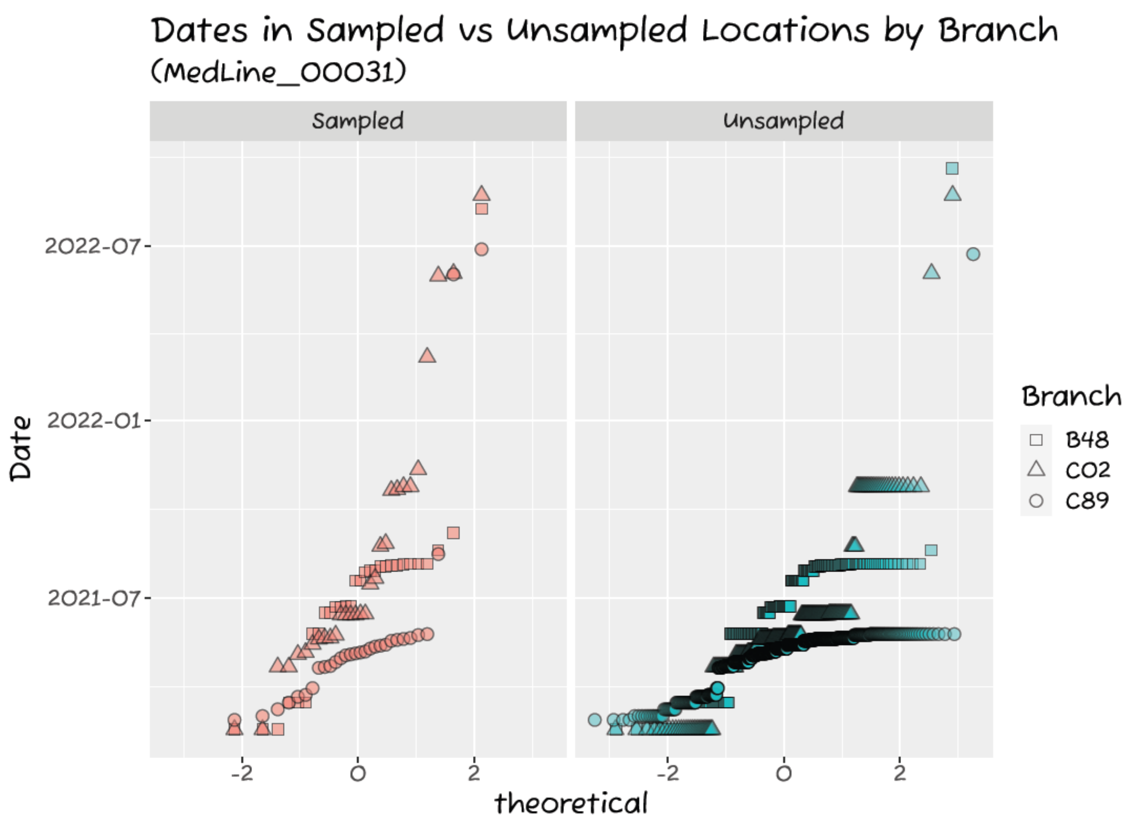


Figure 14 Distributions of Dates between Sampled and Unsampled Locations



The "theoretical" values are used as a common reference to evaluate differences in distributions of pallet sizes. They make no suppositions about what the actual distributions might be.

Figure 15 Comparison of Date Distributions by Branch: Histograms

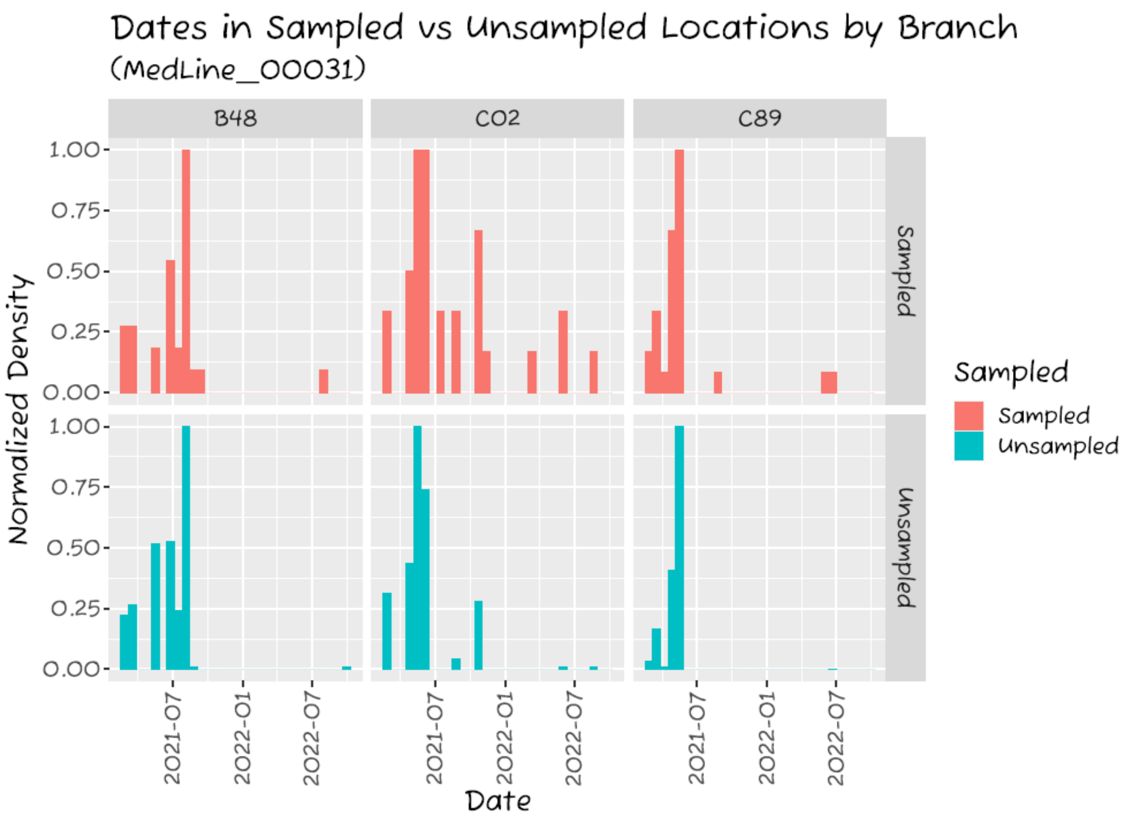
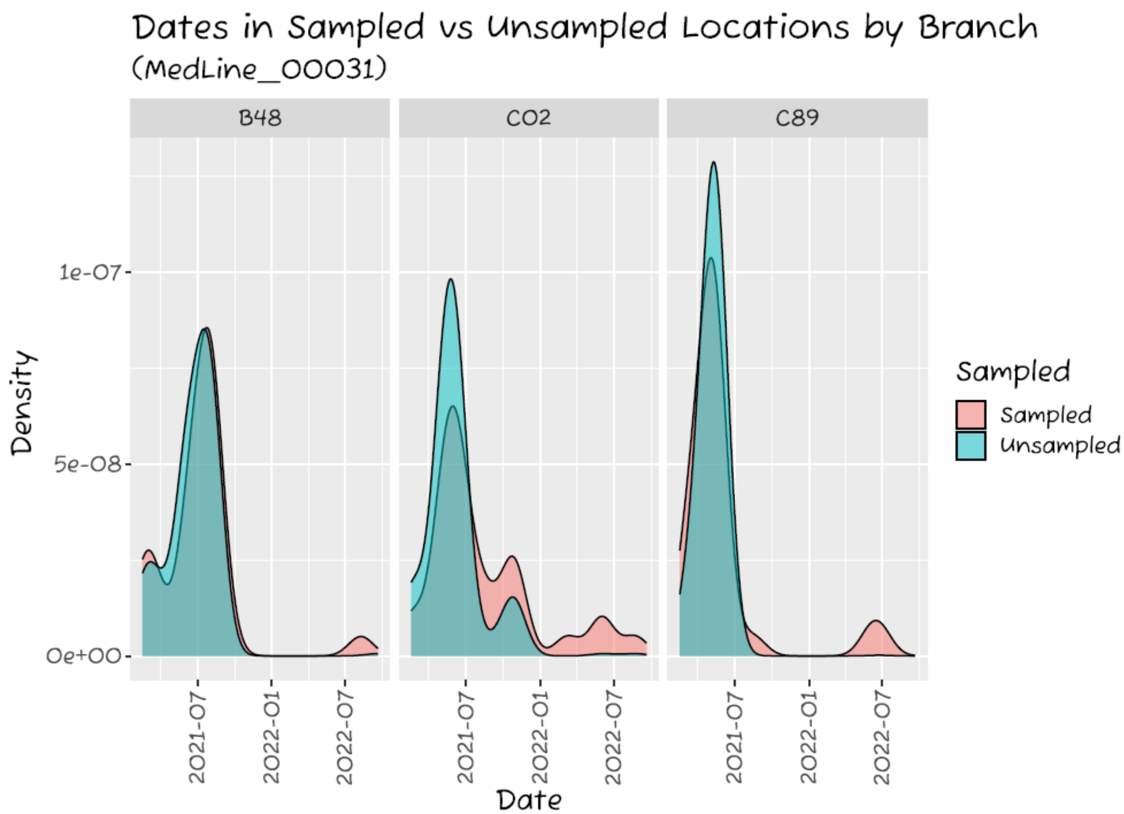


Figure 16 Comparison of Date Distributions by Branch: Density Plots



7 Compendium of ARDL Results (Poulton Report)

Page	Project	Sample	Lot	Size	Man. Date	Test	Outcome	Date	Comment
3	172615	1	T202104			N	ND	1/24/2024	
3	172615	2	No lot number			N	ND	1/24/2024	
3	172615	3	HFK-2021050102			N	ND	1/24/2024	
3	172615	5	MEDCARE202101			N	ND	1/24/2024	"MED202101" perhaps?
3	172615	7	ZKMD01202101			N	ND	1/24/2024	
3	172615	11	MED202011			N	ND	1/24/2024	
3	172615	12	MED202102			N	ND	1/24/2024	
3	172615	13	MED202102			N	ND	1/24/2024	
3	172615	14	MED202101			N	ND	1/24/2024	
3	172615	15	20201106			N	ND	1/24/2024	
3	172615	19	MEDCARE202103			N	ND	1/24/2024	
3	172615	23	QDMD01202002			N	ND	1/24/2024	
3	172615	24	T4			N	ND	1/24/2024	
3	172615	25	HFK-202103010101			N	ND	1/24/2024	
4	172615	1	T202104			PI	PVC	1/24/2024	
4	172615	2	No lot number			PI	PVC	1/24/2024	
4	172615	3	HFK-2021050102			PI	PVC	1/24/2024	
4	172615	5	MEDCARE202101			PI	PVC	1/24/2024	
4	172615	7	ZKMD01202101			PI	PVC	1/24/2024	
4	172615	11	MED202011			PI	PVC	1/24/2024	
4	172615	12	MED202102			PI	PVC	1/24/2024	
4	172615	13	MED202102			PI	PVC	1/24/2024	
4	172615	14	MED202101			PI	PVC	1/24/2024	
4	172615	15	20201106			PI	PVC	1/24/2024	

Kitchen Winners 2024-01-31

Page	Project	Sample	Lot	Size	Man. Date	Test	Outcome	Date	Comment
4	172615	19	MEDCARE202103			PI	PVC	1/24/2024	
4	172615	23	QDMD01202002			PI	PVC	1/24/2024	
4	172615	24	T4			PI	PVC	1/24/2024	
4	172615	25	HFK-202103010101			PI	PVC	1/24/2024	
5	172615	1	T202104			P	Pass/Fail	1/24/2024	
6	172615	2	No lot number			P	Fail/Fail	1/24/2024	
7	172615	3	HFK-2021050102			P	Pass/Fail	1/24/2024	
8	172615	5	MEDCARE202101			P	Pass/Fail	1/24/2024	
9	172615	7	ZKMD01202101			P	Pass/Fail	1/24/2024	
10	172615	11	MED202011			P	Pass/Fail	1/24/2024	
11	172615	12	MED202102			P	Pass/Fail	1/24/2024	
12	172615	13	MED202102			P	Pass/Fail	1/24/2024	
13	172615	14	MED202101			P	Pass/Fail	1/24/2024	
14	172615	15	20201106			P	Pass/Fail	1/24/2024	
15	172615	19	MEDCARE202103			P	Pass/Fail	1/24/2024	
16	172615	23	QDMD01202002			P	Pass/Fail	1/24/2024	
17	172615	24	T4			P	Pass/Fail	1/24/2024	
18	172615	25	HFK-202103010101			P	Pass/Fail	1/24/2024	
19	162931-B Rev. 1	1	HFK-202103010101	M		PI	PVC	1/20/2022	Box clearly says size L
19	162931-B Rev. 1	2	T4	XL		PI	PVC	1/20/2022	Three gloves!
19	162931-B Rev. 1	3	MEDCARE202101	M	2021-01	PI	PVC	1/20/2022	
19	162931-B Rev. 1	4	HFK-2021050102	S		PI	PVC	1/20/2022	
20	162931-B Rev. 1	5	QDMD01202002	L	2020-12	PI	PVC	1/20/2022	
20	162931-B Rev. 1	6	MED202102	S	2021-02	PI	PVC	1/20/2022	
20	162931-B Rev. 1	7	20201106	XL	20201106	PI	PVC	1/20/2022	
20	162931-B Rev. 1	8	ZKMD012	XL	2021-01	PI	PVC	1/20/2022	
20	162931-B Rev. 1	1	HFK-202103010101	M		N	ND	1/20/2022	Labeled "1" in photo on p. 45
20	162931-B Rev. 1	2	T4	XL		N	ND	1/20/2022	Labeled "3" in photo on p. 45

Page	Project	Sample	Lot	Size	Man. Date	Test	Outcome	Date	Comment
20	162931-B Rev. 1	3	MEDCARE202101	M	2021-01	N	ND	1/20/2022	Labeled "4" in photo on p. 45
20	162931-B Rev. 1	4	HFK-2021050102	S		N	ND	1/20/2022	Labeled "5" in photo on p. 46
20	162931-B Rev. 1	5	QDMD01202002	L	2020-12	N	ND	1/20/2022	Same as QDMD01202000212, labeled "2", in photo on p. 46?
20	162931-B Rev. 1	6	MED202102	S	2021-02	N	ND	1/20/2022	Labeled "7" in photo on p. 46
20	162931-B Rev. 1	7	20201106	XL	20201106	N	ND	1/20/2022	Labeled "8" in photo on p. 47
20	162931-B Rev. 1	8	ZKMD012	XL	2021-01	N	ND	1/20/2022	Same as ZKMD01201201, labeled "9", in photo on p. 47 and spectra pp. 63-64?
21	162931		HFK-202103010101			P	Fail/Fail		Maybe sample 1?
22	162931		MED202101			P	Pass/Fail		Maybe sample 3, MEDCARE202101?
23	162931		HFK-2021050102			P	Fail/Fail		Maybe sample 4?
24	162931		MED202102			P	Pass/Fail		Maybe sample 6?
37	162931-A Rev. 1		ZYMD01202103	M	2021-07	PI	ABR	1/20/2022	
37	162931-A Rev. 1		ZYMD01202103	M	2021-07	N	6.93%	1/20/2022	
48	162931-B Rev. 1								"Customer requested sample 2 be deleted from report."
66	164005	Box 1	ZKMD01202104	L	2021-10-01	PI	ABR	4/19/2022	
66	164005	Box 1	ZKMD01202104	L	2021-10-01	N	6.47%	4/19/2022	
75	162399	HFK	HFK-202103010101	M	2021.3	PI	PVC	12/3/2021	
75	162399	MED	MED202101	S	2021-01	PI	PVC	12/3/2021	
75	162399	ZYMD	ZYMD01202103	L	2021-07	PI	ABR	12/3/2021	
75	162399		HFK-202103010101	M	2021.3	N	ND	12/3/2021	
75	162399		MED202101	S	2021-01	N	ND	12/3/2021	
75	162399		ZYMD01202103	L	2021-07	N	6.79%	12/3/2021	
84	161525		HFK-2021050102	S	2021-05	P	Fail/Fail	10/19/2021	"KFK-2021050102" in report
85	161525		HFK-202103010101	S	2021-04	P	Fail/Fail	10/19/2021	
86	161525		MDE202011	M	2020-12	P	Fail/Fail	10/19/2021	Maybe MED202011?
87	161525		ZKMD202104	S	2021-04	P	Fail/Fail	10/19/2021	Maybe ZKMD02202104?

Page	Project	Sample	Lot	Size	Man. Date	Test	Outcome	Date	Comment
88	161525		MED202102	M	2021-02	P	Pass/Fail	10/19/2021	
89	161525		ZYMD01202103	L	2021-07	P	Fail/Fail	10/19/2021	Note that this is NBR.
90	161525		ZKMD01202101	M	2021-01	P	Pass/Fail	10/19/2021	
91	161525		MED202101	S	2021-01	P	Pass/Fail	10/19/2021	

Notes:

“Man. Date” is the “manufacturing date,” evidently as read on the sides of glove boxes.

“Date” is the ARDL report date.

The abbreviations in the “Test” column are N: Nitrogen, PI: Polymer Identification, and P: Physical Properties.

The abbreviations in the “Outcome” column are ND: Not detected, PVC: Polyvinyl Chloride, and ABR: Acrylonitrile Butyl Rubber.

Blanks indicate no information was found in the Poulton report.

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EXPERIENCE

Analysis & Inference, Inc., Springfield, PA (2015 – present) – Statistical Consultant
Analysis and Inference, Inc. is a research and consulting firm specializing in statistics and its application in dispute resolution and litigation support. Dr. Huber's capabilities include data analysis, statistical modeling and simulation, sampling, monitoring, inference, regression, data visualization, spatial data, database design and auditing, quality control, decision analysis, process optimization, real estate analysis, geographic information systems, risk analysis, computer programming, and environmental statistics.

Quantitative Decisions, Rosemont, PA (1997 – present) – Owner
QD provides services in statistical analysis, sampling, litigation support, software development, database design and auditing, geographic information systems, risk assessment, and environmental compliance both independently and collaborating with other consultants. Clients have ranged from US federal regulatory agencies to Fortune 10 companies, international quasi-nongovernmental organizations, research firms, non-profits, academic institutions, and small businesses.

S. S. Papadopulos & Associates, Washington, DC (1998 – present) – Associated Expert
SSPA has a recognized international practice in contaminant studies, environmental engineering, remediation, geochemistry, surface-water hydrology, geographic information systems (GIS), and software development. Dr. Huber complements this expertise with rigorous, defensible statistical assessments of data, optimizing data collection and decisions, statistical support for litigation, and evaluations of conceptual and numerical models applied to data about the environment, occupational health, and risk assessment.

Fiscal Associates, Inc., Newark, DE (2002 – 2014) – Advisor
Fiscal Associates engages in real estate and energy analysis. In an ongoing collaboration with FA, Dr. Huber was awarded a patent for travel time computation procedures and helped with successful extensions of other patents covering real estate analysis. He also supported the award-winning National Energy Independence Plan (NEIP) with statistical and mathematical analysis and editorial direction.

X-Interchange, Inc., Kansas City, MO (2003 – 2008) – Director
XI provided creative solutions to infrastructure and environmental problems. It optimized remedial operations at contaminated sites, developed logistical solutions, and decommissioned industrial sites. Dr. Huber supplied quantitative economic analysis of potential projects and supported marketing and training activities.

Haverford College, Haverford, PA (2005 – 2006) – Visiting Associate Professor of Statistics
Haverford College is a highly ranked small liberal arts institution. Dr. Huber taught undergraduate courses in statistics and exploratory data analysis, supervised thesis work in stochastic differential equations, provided statistical support for undergraduate research and library staff, and trained students in mathematical problem solving.

Directions Magazine, Inc. (2000 – 2002) – Editor
Directionsmag.com is the oldest active source of geospatial information technology news and commentary. In the late 1990's, Dr. Huber had contributed a regular series of technical articles on geographic analysis and GIS software development, covering topics ranging from Fourier analysis to steganography. Upon the untimely demise of its founder, Scott Elliott, in 2000, Dr. Huber assumed the Editor's role, ran the magazine successfully for the next year, and helped hire a permanent replacement.

Pennsylvania State University, Malvern, PA (1997 – 2003) – Part-time lecturer
This branch of the Penn State University system focuses on graduate degree programs in engineering, information science, and business. Dr. Huber developed and taught innovative courses in geographic information systems and environmental statistics. He supervised Masters' thesis work in geographic information systems, soil sampling technologies, and analysis of groundwater contamination data.

Dames & Moore, Inc., Willow Grove, PA and Sacramento, CA (1992 – 1997) – Senior Associate
Dames & Moore provided environmental and geotechnical engineering services to tens of thousands of clients in all sectors. It was a publicly owned engineering company of 3400 professionals in 110 offices worldwide. Coming to D&M through the acquisition of his company IDT, Dr. Huber engaged in project management, marketing, personnel development, and firm-wide technical support for statistics, information management, software development, and risk assessment. He created and led a successful GIS specialty group.

Integrated Data Technologies, Inc, Philadelphia, PA (1986 – 1992) –Software developer / statistical consultant / co-owner
IDT published commercial software products and provided software development, database, and statistical consulting services. Dr. Huber provided technical management in all areas and led scientific visualization research funded by the Ben Franklin Partnership of Pennsylvania.

St. Joseph's University, Philadelphia, PA (1984 – 1986) – Assistant Professor of Mathematics
Taught 17 semester-length courses in mathematics to undergraduates.

Time Distribution Services, New York, NY (1982) – Programmer
Provided custom mainframe programming solutions to support the distribution arm of Time-Life, Inc.

Oak Ridge National Laboratories, Oak Ridge, TN (1978 and 1979) – Researcher in physics
Developed quantum mechanical computer models for an experimental group in atomic spectroscopy and a theoretical group in dielectronic recombination.

EDUCATION

Columbia University in the City of New York, (1978 – 1984). M.A., Ph.D., Mathematics. Research in the geometry of CR manifolds. Dissertation on Classification of Graded Semisimple Lie algebras.

Haverford College, Haverford, PA (1974 – 1978). B.A, double major in Philosophy and Mathematics, with High Honors. College mathematics prizes 1975, 1976, 1977. Phi Beta Kappa.

REPRESENTATIVE PROJECTS

Disparate Impact and Discrimination

Alleged race discrimination. Provided a rebuttal report and affirmative analysis for defendant in a race discrimination case in the Circuit Court of McDowell County, WV. (2021).

Alleged race discrimination (Fair Housing Act). Retained as expert witness for defendant. Analysis of housing and demographic data to rebut claims that defendant's exercise of a deed covenant contributed to housing segregation. U.S. District Court Southern District of New York. (2019)

Alleged age and race discrimination (Fair Housing Act). Expert witness for defendant. Analysis of housing data, demographic data, and applicant data at affordable housing facilities. Rebuttal testimony to support Defendant. US District Court for the District of Columbia. (2018)

Statistical modeling of rates of sexual assault complaints in US universities. Analysis of survey data performed to support an ESPN investigation. (2018)

Alleged discrimination against women (Title VII). Consulting expert. Statistical analysis of employment decisions on behalf of defendant. US District Court for the Middle District of Pennsylvania, Harrisburg Division. (2016)

Alleged age discrimination (ADEA). Retained as expert witness for defendant. Data Analysis and expert report concerning disparate impact in an employee pool. US District Court for the Northern District of Iowa Central Division. (2016)

Claim for overtime compensation (FLSA). Retained as expert witness for defendant. Data collection, analysis, and graphical representation of work patterns and payment schedules. US Court for the Northern District of Florida. (2016)

Allegations of housing discrimination (CT Commission on Human Rights and Opportunities). Consulting expert for defendant. Collected and analyzed demographic and housing data to assess allegations of age discrimination in township zoning policies. (2016)

Collective action for unpaid overtime (FLSA). Consulting expert for plaintiff. Statistical sampling program of a large pool of employees. (2015)

Sampling and Surveying

Healthcare billing insurance dispute. Consulting expert for plaintiff. Designed a plan to sample claims in a dispute about downgrading of codes for emergency services. Developed and applied a statistical model to extrapolate the sample to the complete set of claims. JAMS arbitration. (2021)

Ferguson Point Restaurant Inc. et al. v. Vancouver Board of Parks and Recreation (plaintiff). Evaluated the Stanley Park Mobility Study Survey, a large public survey conducted in the summer of 2020. Supreme Court of British Columbia. (2021)

Kan Qiu *et al.* v Secretary of State of the State of Washington (plaintiff). Analysis of procedures used by the state to sample petitions for certification (expert report). State of Washington Thurston County Superior Court. (2019)

FCA. Confidential client (defendant). Sampling of Medicare claims data in response to False Claims Act allegations against a medical practice (2017).

Other Litigation Support

Cost overrun claim. Cashman Dredging and Marine Contracting Co., LLC, and Weeks Marine, Inc., v. Massachusetts Clean Energy Center (plaintiff). Analysis of geotechnical engineering data. Rebuttal of defendant's statistical models and calculations. Expert report and deposition. Massachusetts Superior Court (2019).

FCA (False Claims Act). Confidential client (defendant). Statistical support to develop a defense against allegations of fraud in a radiological site cleanup (ongoing).

FCA. US *ex rel* Vatan v. QTC, *et al.* (plaintiff). Quality assessment of reviews performed of Veterans' Administration medical files. C. District of CA (2019).

Confidential client (plaintiff). Review and analysis of manufacturing quality control data. N. District of Oklahoma (ongoing).

Tyson Foods (defendant). Critical evaluation of a multivariate principal components analysis (PCA) of 80 variables used to generate a "signature" of environmental contamination in the Illinois River Watershed. State of Oklahoma *v*. Tyson Foods *et al*. (2008).

US Department of Justice (defendant). Discovered and testified to fundamental flaws in statistical and scientific estimates of natural resources damage. State of New Mexico, *et al*., *v*. General Electric, *et al*. (2002).

Envirosafe Services of Ohio, Inc. (defendant). Provided understandable explanations of statistical material produced by expert witnesses and developed independent opinions in a case centering around allegations of the misuse of statistical pollution monitoring tests. Julia R. Bates, *et al*. *v*. Envirosafe Services of Ohio, Inc (1998).

Geostatistics

West Lake Landfill (MO) waste mapping. Provided strategic and technical advice for the geostatistical estimation of waste volumes based on landfill borings. (2017)

Mohawk Chemicals (CA) groundwater investigation. Three-dimensional geostatistical analysis and visualization of geological strata based on cone penetrometer test (CPT) data. (2000)

Fresh Kills mapping. Geostatistical estimation of thickness of a confining layer of glaciolacustrine clay underlying New York City's Fresh Kills landfill (based on borelog data), to determine potential risks from release of leachate. (1997)

New York Harbor dredging. Estimation of three-dimensional extent and costs of dredging. (1996)

Quality control process for hazardous waste remediation. Application of geostatistical techniques to develop measurement and decision procedures to monitor and maintain the integrity of physical stabilization of sludge in a heterogeneous disposal pond with radioactive layers. BP Chemicals (1995).

Three-dimensional mapping of a layered aquifer system. Geostatistical analysis of downhole gamma borelogs and mapping of interfaces between water-bearing units beneath the DuPont Chambers Works facility, New Jersey (1993).

Market Analysis

Confidential client. Developed statistical methods to estimate detailed transactions in a national market for healthcare products. Literature search. Identified and secured additional sources of data to improve the estimates. Implemented the statistical procedures in **R** software. Wrote user and technical documentation and provided training for users. (2016)

(Large hospital—confidential client.) Created statistical models of supply and demand for primary medical services within the region served by a hospital and its competitors. Accounting explicitly for spatial relationships, such as the time and cost of travel, these models provided essential information for identifying communities that would experience changes in service resulting from a proposed hospital move. (2011)

Big Data

Confidential client. Developed statistical methods and wrote software for estimating, tracking, and forecasting the US market for over 400 companion animal medical products at national, state, and regional levels based on daily uploads of individual transactions by veterinary hospitals. (2015 – 2018).

Federal Communications Commission. Led the statistical analysis underpinning the first National Broadband Map created by the FCC. Performed literature review, identified relevant variables from several thousand covering demographic, infrastructure, geographic, and topographic information. Developed and tested logistic regression models, then applied them to predict availability and speed of broadband services at 8.3 million Census blocks throughout the United States. (2009)

Sampling and Monitoring

ConocoPhillips Redesigned the groundwater monitoring program at a large refinery and shepherded it through the process of regulatory approval. Ponca City, OK (2004).

(International manufacturer—confidential client). Designed and supervised sampling of the soils, sediments, water, and groundwater in and around Cuautla, Mexico to investigate alleged contamination by lead and other heavy metals. Managed the data and mapping elements of the study. Performed statistical analysis of the results. As principal author of the resulting investigation report and risk assessment, presented and explained the results to Federal regulatory authorities. Provided additional statistical analysis of medical data collected from town residents (2001 – 3).

(National retail chain—confidential client). Created a formal sampling plan to evaluate the efficacy of a lead cleanup program at a recycling facility in rural Iowa, using sample compositing to minimize the costs of cleanup and demonstrating its success (1993).

Regulatory Compliance

Multiple clients, including DuPont, Ciba-Geigy, American Cyanamid, and Exxon. Through FOIA, obtained and analyzed New Jersey's databases of 15,000 regulated industrial facilities to identify those that would be most affected by proposed changes in environmental regulations. Assisted clients in public meetings to make the state aware of these consequences and to suggest more equitable formulas to determine permit fees (1989 – 1992).

Statistical Review

United States Environmental Protection Agency. One of three peer reviewers responsible for a comprehensive assessment and critical review of the *Statistical Analysis of Groundwater Monitoring. Data at RCRA Facilities—Unified Guidance* (2005).

Database Design and Management

CC:Control. Designed and led the development of a comprehensive relational database used at 100 sites to manage, statistically analyze, and visualize large groundwater monitoring datasets. It included robust outlier detection, quality control procedures, and innovative graphical displays of time series (1990 – 1995).

Data Visualization and Communication

(Confidential client). Designed and prepared graphics to analyze and understand a large database of groundwater monitoring measurements made at one thousand Long Island gas stations. Provided strategies for storing, managing, and mapping all data with a GIS (2010).

Mohawk Chemicals, Mountain View, CA. Mapping and three-dimensional visualization of contamination and geological structures. Designed statistical programs to sample soils, soil gas, groundwater, and geotechnical parameters. Created visualizations of integrated datasets and presented them to state regulatory agencies (1999).

Trane, Lacrosse, WI. Performed innovative exploratory analysis of monitoring and sampling data to identify hidden, inaccessible sources of soil and groundwater contamination. Developed maps and graphs to communicate findings to corporate executives and state regulators. Managed the ensuing remediation project, a soil vapor extraction system (1992 – 1993).

Decision Analysis and Support

Alterra (Wageningen). Developed mathematical models of the utility of agricultural land in the Netherlands based on use, location and proximity. Built software prototypes to support and optimize land redistribution (2003).

FMC Corporation. Employed influence diagrams and decision modeling to lead experts in identifying critical risks in managing environmental liabilities at industrial properties (1996).

Research

MEUK. US patent 10,371,860 awarded 2019 for systems and methods configured to create contour maps of geospatial variables based on hydrometeorological data. With JM Lambie, J Dahl, J Kennel, M Tonkin, and M Karanovic.

National Energy Independence Plan (NEIP). Scientific, mathematical, and statistical modeling of energy markets and alternative energy plans. Editorial assistance with reports and presentations (2009 – 2014).

GridRoute. US patent 8,332,247 awarded 2012 for algorithms integrating vector and raster data structures to support high-speed, large-volume computation of travel times utilizing networks embedded within a spatially extensive matrix.

Groundwater Data Visualization (Ben Franklin Partnership of PA). Secured and directed a $100K research grant to develop PC software for innovative visualization of spatial data (1991).

PROFESSIONAL ACTIVITIES

American Statistical Association-Philadelphia. **Vice President,** 2022 – 2023. **Treasurer,** 2015 – 2021. **Newsletter Editor,** 2014 – 2015.

Editorial Board, *Risk Analysis* 2009 – 2013.

Elected moderator of the professional statistics and GIS communities on the Web at http://stats.stackexchange.com 2011 – present.

Best reviewer award. Society for Risk Analysis 2009.

Leader, Haverford College Problem Solving Group. 2005 – 2018.

Author of over 40 open source software programs to perform statistical and geometric analysis and visualization of data. 2000 – 2005.

Teaching

Regression Methods. Math 8406, Villanova University, 2015.

Groundwater Statistics. 8-hour workshop. Nestle North America, 2014.

Environmental Statistics in Pennsylvania. 8-hour workshop. PA Council of Professional Geologists, 2010 and 2011.

Spatial Statistics. 40-hour workshop, 2007. 8-hour workshop on the web. NITLE, 2010

Introduction to GIS. Geology 328, Bryn Mawr College, 2007.

Problem Solving. Weekly undergraduate seminar at Haverford College, 2005 – present.

Introduction to Statistics. Math 103, Haverford College, 2006.

Statistics. Math 203, Haverford College, 2006.

Exploratory Data Analysis. Math 209, Haverford College, 2005.

Environmental GIS. Systems Engineering 597, Penn State-Great Valley, 1997 – 2003.

Environmental Statistics. Computer Engineering 597, Penn State-Great Valley, 2001.

Environmental Sampling. Two-day course developed and taught for Government Institutes, 1994 – 1995.

Selected Presentations

Discrimination and Fraud: A Statistical Expert's Perspective. Risk Institute Online. May 2021.

Quantitative Reasoning in the Law. LawStudy 695-1, Northwestern University School of Law. Guest lecturer, 2020.

Contracts, Documentation, and Trust. SSPA Technical Meetings. November 2018.

SELECTED PUBLICATIONS

DiFilippo, Erica, Matt Tonkin, and William Huber. 2023. *Censored Multiple Regression to Interpret Temporal Environmental Data and Assess Remedy Progress*. Groundwater, April 2023. https://doi.org/10.1111/gwat.13315

Fairley, William B., and William A. Huber. 2020. *On Being an Ethical Statistical Expert in a Legal Case.* The American Statistician, May, 1–11. https://doi.org/10.1080/00031305.2020.1763834.

Fairley, William B. and William A. Huber, 2018. *Statistical Criticism and Causality in Prima Facie Proof of Disparate Impact Discrimination.* Observational Studies, January 2018.

Tonkin, Matthew J., Jonathan Kennel, William Huber, and John M. Lambie, 2016. *Multi-event Universal Kriging (MEUK)*. Advances in Water Resources **87** (2016) pp. 92-105. doi:10.1016/j.advwatres.2015.11.001

Huber, William A, 2010. *Ignorance is Not Probability*. Risk Analysis **30** issue 3, pp 371-376, March 2010. doi: 10.1111/j.1539-6924.2010.01361.x

Huber, William A., 2010. Comment on *Why Risk is Not Variance: An Expository Note*. Risk Analysis **30** issue 3, pp 327-8, March 2010.

Huber, William A., 2009. *The Unfinished Game* by K. Devlin. Risk Analysis **29** issue 9, pp 1336-1341, September 2009.

Guagliardo, Mark F., William A. Huber, Deborah M. Quint, and Stephen J. Teach, 2007. *Does Spatial Accessibility of Pharmacy Services Predict Compliance with Long Term Control Medications?* Journal of Asthma, 44:10, 881-883. doi: 10.1080/02770900701752680

Cox, LA and WA Huber, 2007. *Symmetry, Identifiability, and Prediction Uncertainties in Multistage Clonal Expansion (MSCE) Models of Carcinogenesis*. Risk Analysis 2007 Dec(6): 1441-53. doi: 10.1111/j.1539-6924.2007.00980.x

Sinton, Diana and William A. Huber, 2007. *Mapping Polka and Its Ethnic Heritage in the United States*. Journal of Geography **106** 41-47. doi: 10.1080/00221340701487913

Cox, LA, D Babayev, and WA Huber, 2005. *Limitations of Qualitative Risk Assessment*. Risk Analysis **25** (3), 651-662. doi: 10.1111/j.1539-6924.2005.00615.x

Huber, William A, 1996. Discussion: *Detection of Low-level Environmental Pollutants.* Environmental and Ecological Statistics.

Huber, WA and C Bottcher, 1980. *Dielectronic Recombination in a Magnetic Field. J. Phys. B: At. Mol. Phys.* **13** L399-L404.

Appendix: Testimony in the Last Five Years (2019 – 2023 inclusive)

Year	Caption or subject	Jurisdiction	Identifier
2023	Reuschel at al. vs. **Chancellor Senior Management, Ltd**.	SD of WV at Beckley	5:22-cv-00279
2023	**McCune** vs. Midwest Can Company	Circuit Court of Cook County, Illinois	2021L004118
2023	**Carlos and Rosalia Fernandez** v. Walmart Inc. et al.	Superior Court of the State of California for the County of Riverside	RIC1904598
2022	Connecticut Fair Housing Center and Carmen Arroyo *v.* **CoreLogic Rental Property Solutions, LLC**	US District Court, District of CT	3:18-cv-00705-VLB
2021	Deshawn Briggs, et al., v. **Allister Adel, et al.**	US District Court, District of Arizona	CV-18-2684-PHX-EJM
2020	Greg Adkisson, et al., v. **Jacobs Engineering Group**	US District Court, Eastern District of Tennessee	3:13-CV-5050-TAV-HGB
2019	Maurice A. Alexander v. **Edgewood Management Corporation et al**. Case No. 1	US District Court, District of Columbia	15 cv 01140-RCL
2019	**Cashman Dredging and Marine Contracting Co., LLC**, and Weeks Marine, Inc., v. Massachusetts Clean Energy Center	Commonwealth of Massachusetts Superior Court	SUCV2016-02305

(Client names in **bold** type.)